REMARKS/ARGUMENTS

Claims 1-11 are pending herein. Claims 1-7 stand withdrawn. Claims 8 and 10 have been amended as supported by page 11, line 21--page 12, line 1 of the present application, for example.

1. Claim 1 was objected to for the reasons explained in the first paragraph of page 2 of the present Office Action. This rejection is respectfully traversed.

The Examiner is respectfully requested to note that claim 1 stands withdrawn. Applicants will respond to the present rejection, however, in the event that the Examiner inadvertently referred to claim 1 rather than claim 8.

The Examiner is respectfully requested to note that MPEP 2113 recites that the "structure implied by the process steps should be considered when assessing the patentability of the product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product." As will be further discussed below, the process steps recited in claim 8, in addition to the other features recited in claim 8, impart a novel product that is clearly not disclosed or suggested in the prior art of record. Accordingly, reconsideration and withdrawal of the present objection are respectfully requested.

2. Claims 8-11 were rejected under §103(a) over Dubois in view of Asakura and Okikawa. To the extent that this rejection may be applied against the amended claims, it is respectfully traversed.

Claim 8 recites a heat spreader module constructed by supplying active hard brazing materials each containing an active element, between a pedestal, a heat spreader member, an insulating board, and a metal plate. The heat spreader module is further constructed by pressing and heating the pedestal, the heat spreader member, the insulating board, and the metal plate to melt the active hard brazing materials, thereby

joining the pedestal, the heat spreader member, the insulating board, and the metal plate together. The active hard brazing materials are supplied such that the active hard brazing materials have a thickness ranging from 3 to 20 μm when the active hard brazing materials are melted. The active element is contained in an amount ranging from 400 to 1000 $\mu g/cm^2$, and the heat spreader member has a thermal conductivity of 150 W/mK or greater.

First, Dubois does not disclose the use of hard brazing materials. With reference to annotated Fig. 2 shown below (some details removed for clarity), the attachment devices disclosed in Dubois will discussed in further detail.

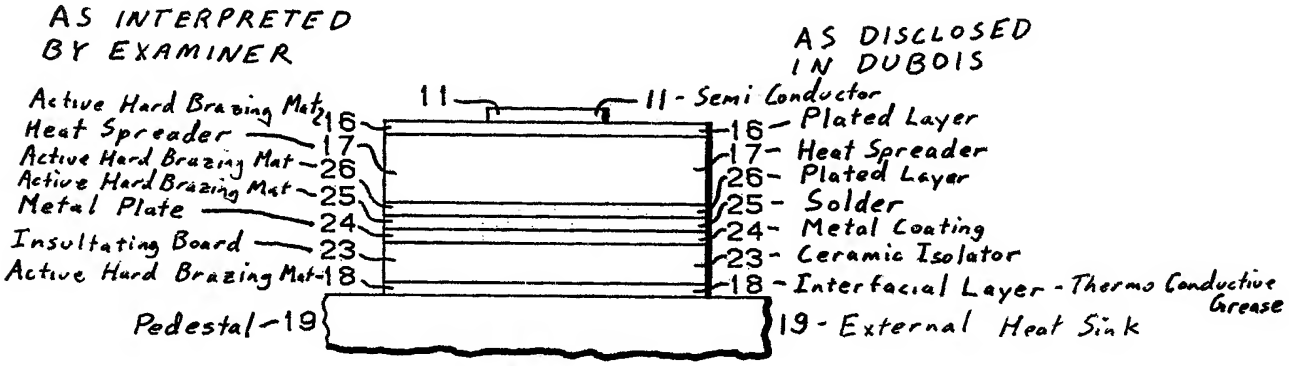


FIG 2

To help distinguish the Examiner's interpretation of Dubois, please note that the terms provided on the left side of the annotated figure are those provided by the Examiner in the Office Action, and the terms provided on the right side of the annotated figure are those provided by Dubois.

Looking first at the alleged hard brazing material 18, this layer is disclosed in Dubois, in column 4, lines 30-34, to be an interfacial layer 18, which exists in all devices which are only mechanically coupled to a heat sink 19. Dubois discloses that the interfacial layer 18 can be filled with a thermally conductive grease to reduce the thermal impedance of the interfacial layer 18. Clearly, the alleged hard brazing layer 18 of Dubois is not hard braze, but rather is a layer of thermally conductive grease

used to reduce the thermal impedance between two objects which are mechanically clamped together.

The alleged hard brazing material 16 of Dubois is not a hard brazing material. Dubois discloses in column 5, lines 6-8, that layer 16 is an optional plating layer. Dubois does not disclose or suggest any particular composition of the plating layer 16. However, it is clear that the plating layer 16 is not a hard brazing material.

The alleged hard brazing material 25 is not a hard brazing material. Layer 25 is disclosed in column 5, line 12 as a solder layer 25. Solder is well known in the art to be a material used in joining that has a melting point below 450°C. Quite to the contrary, hard brazing materials have melting points significantly higher (well above 450°C) requiring significant changes in both joint design and assembly process techniques. Changing from solder to a hard brazing material is not merely a choice made by a customer. Any such change requires a significant redesign to ensure compatibility, the requirements of such redesign not being something known by one having ordinary skill in the art.

For at least the foregoing reasons, Dubois fails to disclose any use of hard brazing materials. Specifically, with reference to annotated Fig. 2 shown above, Dubois fails to disclose any active hard brazing materials supplied between a pedestal, a heat spreader member, an insulating board, and a metal plate, as recited in claim 8.

Second, the Examiner is respectfully requested to recognize the meaning of an active element. In the Office Action, the Examiner stated that "all elements are active and function." This is not true within the context of the present claim language. As disclosed on page 13, lines 5-15, active elements are specifically selected from particular groups depending on the adjoining materials. For example, titanium is chemically active with the adjoining materials. Certainly, all elements are not chemically active with respect to all materials. Therefore, Dubois fails to disclose an active hard brazing material, as disclosed in claim 8.

Third, Dubois does not disclose the thermal conductivity of the heat spreader member. Therefore, Dubois fails to disclose a heat spreader member having a thermal conductivity of 150 W/mK or greater, as recited in claim 8.

Asakura fails to overcome the deficiencies of Dubois. Asakura discloses platings used for electrical terminals. The disclosure of Asakura would not have taught or motivated one skilled in the art to attach various layers of the semiconductor powered device of Dubois using active hard brazing materials. Okikawa, also used by the Examiner for its apparent disclosure of a particular amount of an active element, would not have overcome the deficiencies of Dubois.

For at least the foregoing reasons, a heat spreader module constructed by supplying active hard brazing materials each containing an active element, between a pedestal, a heat spreader member, an insulating board, and a metal plate using the process disclosed in claim 8, would not have been obvious to one skilled in the art given the disclosures of Dubois, Asakura, and Okikawa. Since claim 9 depends directly from claim 8, claim 9 is also believed to be allowable over the applied prior art.

Claim 10 recites a heat spreader module constructed by supplying active hard brazing materials each containing an active element, between a pedestal, a heat spreader member, an insulating board, and a metal plate. The heat spreader module is further constructed by pressing and heating the pedestal, the heat spreader member, the insulating board, and the metal plate to melt the active hard brazing materials, thereby joining the pedestal, the heat spreader member, the insulating board, and the metal plate together. The metal plate includes a marginal edge of alloy having a width within a range of 200 μm. The heat spreader member has a thermal conductivity of 150 W/mK or greater.

For at least the reasons stated above, Dubois fails to disclose the inclusion of active hard brazing materials each containing an active element, between a pedestal, a heat spreader member, an insulating board, and a metal plate. Because Dubois does

not disclose joining these members using an active hard brazing material by pressing and heating, there will not be a resulting metal plate including a marginal edge of alloy having a width within the range of 200 μm. The Examiner's comment on page 4 of the present Office Action, that "it is old and well known for one [of] ordinary skill in the art to design their products to have a width within a range of 200 μm depending on customer requirements such as cost, size, strength and materials usage" is misplaced. The process disclosed in Dubois clearly does not even provide for the basic requirements, such as an active hard brazing material, which could create a marginal edge of alloy. Furthermore, such an alloy could not be created using the process of Dubois even if the proper materials were present. Therefore, a heat spreader module having a metal plate including a marginal edge of alloy having a width within a range of 200 μm, as recited in claim 10, would not have been obvious to one skilled in the art given the process and product disclosed in Dubois regardless of customer requirements.

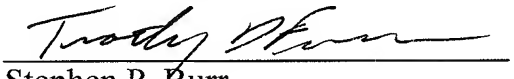
As discussed above, Asakura and Okikawa both fail to overcome the material and process deficiencies of Dubois. Therefore, a heat spreader module constructed using the process recited in claim 1 would not have been obvious to one skilled in the art given the disclosures of Dubois, Asakura, and Okikawa. Since claim 11 depends directly from claim 10, claim 11 is also believed to be allowable over the applied prior art. For at least the foregoing reasons, Applicants respectfully submit that claims 8-11 define patentable subject matter over the art of record. Accordingly, reconsideration and withdrawal of the present rejection are respectfully requested.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

July 21, 2006
Date



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